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THE CARE OF MILK AND CREAM.

By T. A. F. Wiancko, Dairy Instructor and Inspector.

THE real foundation of the whole dairy business lies in the milk-producer. The chief necessity, then, in improving the dairy conditions is to give the producer such a knowledge of the right methods of handling and caring for milk and cream that he will not only see the necessity for such methods, but may also know how best to accomplish this purpose. Many people, when handling milk or cream, seem to forget that they are dealing with food products. There is a tendency for certain unfortunate practices to invade the dairy business. If filth is allowed to get into milk, or to taint it at any point of its production, no amount of care thereafter can make amends for the damage done.

FLAVOUR AND QUALITY.

Milk, cream, and butter are among the most highly prized of human foods, not only on account of their high food value, but also because of the fine flavour they impart to other foods. Flavour, then, is of first importance, and in order to preserve it in its true and natural state, clean and sanitary conditions must be closely studied and strictly adhered to.

Bad flavours may be caused by the food consumed by the cow, such as leeks, onions, turnips, spoiled and fermented feeds, and from impure water, or from the milk absorbing odours of stables, cellars, kitchens, etc., but by far the greatest source of bad flavours is the result of the growth of injurious bacteria, yeasts, and moulds.

BACTERIA.

Like other plants, bacteria require food, warmth, and moisture for growth. They absorb their food from the material in which they grow. The food elements they require are present in the constituents of milk, and they are in a readily available state. Nitrogen, carbon, oxygen, and mineral matter are essential and are furnished by the casein, milk-sugar, and mineral salts.

SOURCES OF BACTERIA IN MILK.

Milk may be contaminated by bacteria from within the udder, or introduced into the milk by dust falling from the stable air, by hair, small particles of skin, or manure falling into the milk-pail from the flanks and udder of the cow, and by dirt from the hands and clothing of the milkers. The greater part of this filthy matter dissolves in the milk, giving it not only undesirable odours and taints, but also inoculating it with the various kinds of bacteria. These germs may also have been gathered from stagnant water, muddy pools, or miry yards. While the majority of them may not be disease-producing or especially harmful, should they be transmitted to the human system, yet, to say the least, they are factors in bringing about decomposition of the milk.

HOW TO KEEP MILK PURE.

Filth and disease germs go hand in hand; the same carelessness that allows the one is likely to give access to the other. Hence it is of the highest importance that the cow and her surroundings be kept as clean as possible. This can be accomplished by brushing off all the loose dirt and dust from the flanks and udder. This will take but a moment, and will prevent large quantities of filth from getting into the milk. The amount of dirt that gets into the milk is one of he chief causes of its rapid spoiling, and the contamination from dissolved filth can never be entirely eliminated.

THE HERD.

The first requisite for pure milk is healthy cows. Any animal suspected of being sick or out of condition should be at once separated from the herd and not allowed to remain near the dairy. Milk should never be used until five days after calving, nor from a sick cow nor one with a diseased udder.

BARNS AND STABLES.

Costly barns or stables are not essential to the production of clean milk or to the maintenance of a dairy herd at its highest efficiency. To obtain the best results, however, it is important that the cows be kept comfortable at all times. The barnyard should be well drained and covered with gravel, stone, or cement. The contamination which a cow gets from muddy "manury" barn lots and stagnant pools of water is especially bad. A tight, reasonably smooth floor, with a gutter suitably located, should be provided, and the stable thoroughly cleaned and swept at least twice daily. It is advisable to haul the manure directly to the field from the barn, but if this is not feasible it should be removed at least 40 feet from the barn. In no case must it be allowed to accumulate against or near the dairy-barn.

LIGHT AND PURE AIR.

Two things almost universally lacking, or, at least, inadequately supplied in dairy-barns, are light and pure air. These are easily obtained, and although absolutely essential to the best health of the herd and the economic production of clean milk, they are rarely appreciated.

Most dairy-barns do not contain sufficient windows. If a barn is already built, more windows can easily be provided. There should be 4 square feet of glass for each animal, and the lighting so provided that the sunlight may reach all parts of the stable some time during the day.

Some good system of ventilation should be provided, as the cow's feed cannot be properly digested and assimilated without an abundance of oxygen; and unless this is supplied a great waste of food as well as impaired health of the cow, will result.

To be sanitary, a dairy-barn should be whitewashed at least twice a year. An interior with a few boards or poles laid overhead at irregular intervals, with hay or straw hanging through, and with the sides in no better condition, cannot be properly whitewashed, and is one of the most prolific sources of dust, cobwebs, and dirt which fall into the milk laden with injurious bacteria. The ceiling should be tight, excluding all dust and chaff from above, and the sides smooth, thus affording a firm surface to which whitewash can cling.

PLATFORMS.

It is of the utmost importance in keeping cows clean that the platform on which they stand should be of the proper length. If too short the cows cannot lie down comfortably, and if too long the droppings will fall on the rear of the platform and the cows will become soiled when lying down. A good arrangement is some form of movable stanchion or manger, so that the length of the platform can be adjusted to suit the length of each individual cow.

MILKING.

The quality of the milk is also dependent to a great extent upon the milker. His personal habits largely determine the cleanliness of the product. He should be personally clean, have cleanly habits, and enjoy perfect health. A bucket of clean water and a clean cloth should always be used to moisten the flanks and udder of the cow before milking. When these parts are dampened, the dust, dandruff, and loose hairs will adhere to them and minimum amounts fall into the milk.

Milking should never be done just after handling hay or bedding, or when the stable is full of dust or bad odours from any cause, for dust is one of the most common sources of the bacteria found in milk, and bad odours may readily be absorbed by the milk.

A milk-pail with a small opening, or one with the top partially covered, is always advisable. The pail should be held close to the udder so as to expose the milk to the air as little as possible. The further the streams fall and the more they spray, the more dirt and bacteria they collect. Milking should be done only with clean, dry hands. Milking with wet hands is filthy. The clothing of the milker should be of washable material and kept properly clean.

STRAINING.

The milk should be removed from the stable to a clean, airy place, such as a dairy-house which is free from dust, flies, and bad odours, as soon as possible after it is drawn, and strained at once.

A good milk-strainer should be simple in its construction; all parts of it should be easily accessible for thorough cleaning, its meshes should be fine enough to remove all the solid foreign matter, and at the same time to allow the milk to pass through reasonably fast. All things considered, a strainer consisting of a fine wire gauze and four layers of cheese-cloth is most practical and efficient.

The cause of many of the most costly disturbances in dairying, such as rapid souring, bad odours, and all sorts of abnormal fermentations, has been traced to the filthy condition of the milk-strainer.

The strainer immediately after use should be thoroughly rinsed in cold or lukewarm water; then washed in hot water to which a small quantity of some good washing-powder has been added; then rinsed in boiling water, sterilized by exposure to live steam, or by boiling in clean water and dried in the sunlight, or in a dust-free, clean room.

THE DAIRY-HOUSE.

This building should be convenient to but entirely separate from the barn where the milking is done. It should be just large enough for actual needs, so that it cannot be used as a general store-room. A cement floor is to be recommended wherever possible, and should be constructed with a slope towards a gutter communicating with a drain situated on the outside of the building, so that the waste water can be carried off for a considerable distance. The walls and ceiling should be smooth, so that they can be quickly and thoroughly cleaned. There should be plenty of light and ventilation. The windows and doors should be screened summer and winter. There should be convenient arrangements for washing, scalding, and drying dairy utensils, and an abundant supply of pure water for cooling the milk or cream.

In case a special dairy-house cannot be provided, the milk or cream should be handled and stored in a clean, light, and well-ventilated place, free from strong odours of any kind. A cellar is usually a very poor place for this purpose, especially if also used for storing vegetables.

SKIMMING THE MILK.

If the product sold is cream, the milk should be separated at once, while still warm, and the cream therefrom should be immediately cooled to as low a tempera-

ture as possible. It might seem that it is not necessary to take this precaution in producing cream for butter-making, since it should be sour for churning; but when it is to be kept for two days or longer before it is delivered to the creamery, it is very important to check all fermentations, good or bad, so as to allow the butter-maker to have full control of the souring process. He can then make a much more uniform grade of butter of better keeping quality, as well as a much better-flavoured product.

LOCATION OF CREAM-SEPARATOR.

When a separate milk-house is available the cream-separator should always be found there, and never operated in the stable or any other place where the air is impure or the surroundings bad. A simple, clean room with a solid floor and screened doors and windows can be made to answer very well as a place to separate cream.

CARE OF THE SEPARATOR.

It is important that the separator runs smoothly. Any trembling or shaking of the separator while skimming will cause a loss of butter-fat in the skim-milk. It is essential, then, that the machine be set upon a firm foundation and properly levelled. Each separator is usually accompanied by specific directions for setting up and operating, and these should be carefully followed. The life of a standard separator depends to a large extent upon the care it receives. One that is allowed to become gummy or dirty may wear out in a year, while if properly cared for will last half a lifetime. It should be kept level, free from dirt, and well oiled. Uniform turning will contribute to skimming efficiency and to the life of the machine.

CLEANING THE SEPARATOR.

Many dairymen are neglectful in the cleaning of the separator, and some seem to think that it is unnecessary to wash them more than once a day. Even when the bowl is rinsed with warm water, there remains a coating of slime and milk on the interior parts which readily undergoes decomposition. When next used the warm cream in passing becomes contaminated with bacteria from this source, and it is injured beyond repair. Such cream may be dangerous to health, and it is certainly unfit for butter-making.

CARE OF THE CREAM.

Warm cream should never be mixed with that which is cold or older, since this brings about conditions favourable to the growth of all kinds of bacteria which produce bad flavours. This can be avoided easily by providing two small cans in addition to the larger one for storage. One of these should receive the warm cream direct from the separator and be immersed in the cooling water until the next milking, when the other small can is put into its place, and the cream in the first small can may be poured into the main supply in the storage-can and thoroughly mixed by efficient stirring. Cream or milk should never be stirred with anything but a well-tinned or enamelled long-handled spoon or dipper. No amount of washing and boiling can keep a wooden stirrer sweet and clean, and its use cannot be too strongly condemned.

The cream-can should not be closely covered, for moulds and putrefactive bacteria, which always produce bad flavours in the cream, find an ideal condition for their development in the dark, moist, closely confined space thus provided. If necessary to cover the can, this should be done with a loose-fitting cover. A clean piece of white muslin or a piece of wire gauze would be suitable for this purpose. While the cream is cooling the lid should always be removed from the can, thus giving the animal odours a chance to escape.

CARE OF THE MILK.

If producing milk for direct consumption, the sooner it is cooled after milking the better. If the milk is kept at low temperature the development of the bacteria

in the same is greatly retarded. These organisms obey the laws that govern the growth of all plant-life, and just as our cereal grains will not grow in early spring or winter, so the bacteria present in the milk are greatly checked in their development, or even prevented from growth, by lowering the temperature of the milk. It must be remembered, however, that such *low temperature must be continuous to be most efficient.*

Any of the milk-coolers of the corrugated copper or pipe style, that provide for the cold water coming in at the bottom and overflowing at the top, with the milk running over the outside in a thin sheet, are very good, but their efficiency is dependent on the temperature and amount of the water and the rate of the flow of the milk. When milk is cooled over a large surface exposed to the influence of water of a low temperature, it is almost instantaneously rendered unfit for germ-growth, and this mainly determines its keeping quality.

Very good results may be obtained by setting the milk-cans directly into tubs or a tank of cold or running water, if the milk is frequently stirred until the desired temperature is reached. If this method is followed the use of a thermometer is absolutely essential.

UTENSILS.

All milk-pails and other dairy utensils used in handling milk and cream should be of such construction and material that they can easily be kept clean. Many are to be found in use with open or rough seams and joints, so that the milk can never be completely removed from them by any ordinary methods of washing, and it remains there to sour and decay, inoculating each milking with millions of the most undesirable bacteria. The use of sound utensils, well tinned, free from rust, and in a cleanly condition, is essential to good milk. Dented or battered pails, cans, etc., and seams that are not properly flushed with solder cannot be readily cleaned. Such uneven surfaces invite contamination that is readily imparted to the milk, though the latter is subjected to it only for a very short period. New pails and cans may cause an immediate improvement in the product.

An essential requirement in any utensil for handling milk is simplicity, to which should be added durability. Nothing will contribute so much to the cause of better milk and cream as will the sanitary milk-pail, if properly used and cared for. The critical period in the life of milk is during the time of milking. Very few who have not made careful tests realize to what extent the wide-open pail invites dirt, as compared with one partly covered. These assist very materially in excluding dirt and dust, and when we fully realize that dust-particles are the carriers of infection, the advantages of excluding them are obvious. Milking-pails should never be used for any other purpose.

WASHING DAIRY UTENSILS.

This is a very important question, though it involves but a few simple considerations. They should be rinsed first of all with cold or lukewarm water to remove all particles of milk. This step should never be omitted, for hot water tends to cook the milk fast to the tin, forming a sticky layer over the surface which is very difficult to remove. They should then be thoroughly scrubbed with a brush in warm water to which a small quantity of good washing-powder, such as "Sandalette" or "Crescent Cleaner," has been added. The washing should be followed by thorough scalding with water as near the boiling-point as possible, after which the vessels should be inverted on a rack to drain and dry from their own heat. If possible, they should be placed where the sun will shine on them, as that will do much toward keeping them pure and sweet. The protection of utensils from accidental contamination after they have been thoroughly washed and scalded has a measurable effect in reducing the germ content of the milk.

DELIVERY OF MILK AND CREAM.

The producer should have some interest in the delivery of his product, especially if he has given it good care and is supplying a creamery or city milk plant where

quality is recognized. It is important that the time from the cow to the churn or consumer be as short and the conditions as favourable as possible. If the milk or cream is delivered early in the morning during hot weather, and the cans properly protected by covering with a wet sack and a dry cloth or blanket over all while on the road, the farmer will be enabled to deliver his product at a much lower temperature than would otherwise be possible.

SUMMARY OF IMPORTANT NOTES.

It pays to make the cows comfortable at all times, and to treat them with invariable kindness.

Stables should be well ventilated, lighted, and drained; should have tight floors and walks and be plainly constructed.

Allow no strong smelling material in the stable and avoid feeds that will taint the milk.

Clean and sweep the stable thoroughly every day and remove the manure at least 40 feet from the barn.

Whitewash the stable twice a year.

Provide pure water in abundance for the cows.

Before milking, brush the udder and flanks of the cow with a stiff brush, and sponge off the udder with clean water, leaving it moist, but not dripping wet.

Milk with clean, dry hands; never allow the hands to come in contact with the milk.

Remove the milk of every cow at once from the stable to a clean, dry room where the air is pure.

Strain the milk through a fine wire gauze and several layers of cheese-cotton as soon as it is drawn.

The strainer should be first washed in tepid water, and boiled after every milking, and then dried in pure air.

If selling milk, cool it at once after milking to check germ-development. Keep it cold until it is delivered. An initial cooling is useless unless it is continued.

If producing cream, the milk should be separated while still warm and fresh, and the cream cooled immediately.

Warm milk or cream must be cooled before being mixed with that which is cold or older.

All utensils, including the separator, should be thoroughly cleaned at once after being used. Wash in lukewarm water and then thoroughly scald with boiling water or live steam.

A brush is preferable to a cloth for washing tinware.

When delivering in warm weather, cover the cans with a wet sack, and a dry cloth or blanket over all, while on the road.

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